

REPORT ON

**USE OF WATER GAS TAR AS A
WOOD PRESERVATIVE**

By

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QUALIFICATIONS

I have extensive experience working with Government regulatory agencies, State agencies that specify and use treated wood, standard writing organizations such as American Wood-Preservers' Association and American Society for Testing and Materials. I also have nearly 38 years experience providing information on wood deterioration/wood protection, wood treatment/wood preservation, wood preservation standards and specifications, and Government regulations concerning the use of wood preservatives. Twenty-nine of those years were spent doing research at the U.S Forest Products Laboratory. I have conducted research on basic problems associated with wood protection involving the use of creosote to treat and preserve wood products. My *Curriculum Vitae* has more detail and is attached as appendix A. A list of my publications is attached as appendix B.

SCOPE OF WORK

On behalf of your client, Northern States Power Company (NSP), you have asked my opinion with respect to the following: could tar resulting from the production of manufactured gas, at a plant which utilized a carbureted water gas process, be used as a wood preservative?

RESEARCH

Contacts:

1) In October, 1998 I contacted Mr. Howard Simon, Allied Signal Inc. about the specifications for water gas tar (WGT) vs. coke oven tar (COT). Howard provided me with the following information:

	<u>Water Gas Tar</u>	<u>C.O.Tar</u>
Specific Gravity @ 60°F	1.023	1.20
Water, %	20	5
Ash, %	4	0.2
Xylene Insolubles, %	21	15
Oil Content, %	42	35

The WGT was used as produced to treat wood, however the COT was distilled to produce coal tar creosote (CTC). In some cases some COT was added back to creosote to increase the viscosity of the CTC. In this case the best comparison can be made between the tars of the two systems. The specification that is probably most important here is the difference in the specific gravities. These differences (1.023 and 1.20) are considered significant in the wood preserving industry because the higher specific gravity systems tend to perform better in service. Howard Simon is Technical Director for Allied Signal Inc., Carbon Materials & Technologies, 3330 South Third Street, Ironton, OH 45638, Phone 740/533-6502. I've known Howard for many years and he has an excellent background in organic tar preservative products.

2) On October 7, 1998 I spoke with Mr. Dan Davies, retired from Koppers Co., Pittsburgh, PA. It was Dan's understanding that WGT was low enough in viscosity that it could be used to treat wood just as it came from the gas plant. Dan Davies was Manager of Research & Development, Forest Products Group, Koppers Co. until he retired 16 years ago. As manager, Dan had the responsibility of wood preservatives including creosote and all treating processes. His address now is Dan Davies, 1020 West Olympia St., Hernando, FL . Phone 352/746-1302.

References

Tar produced from the production of manufactured gas, at a gas plant which utilized a carbureted

consumption of WGT made up an average of 7 % of the domestic creosote.

The following table gives the range of prices paid for these wood preservatives during the years 1917 to 1929, the only years for which I've been able to find price information for WGT.

Year	Refined WGT (cents per gallon)	WGT Solution (cents per gallon)	CTC (cents per gallon)	CTC Solution (cents per gallon)
1917	4.25 to 6.50	— —	8.00 to 17.00	— —
1918	5.36 to 7.50	— —	7.71 to 25.00	— —
1919	6.31 to 10.00	8.00	13.00 to 21.30	12.00 to 13.50
1920	6.31 to 10.00	8.00 to 15.00	9.80 to 45.00	9.30 to 26.00
1921	8.37 to 9.25	— —	14.00 to 32.50	9.00 to 18.00
1922	8.00 to 14.00	— —	13.20 to 18.50	12.00 to 25.00
1923	8.00	8.56	14.50 to 23.00	9.31 to 20.00
1924	8.00 to 9.98	11.00 to 12.00	14.20 to 20.00	13.23 to 22.40
1925	10.00	10.00 to 12.00	12.50 to 23.50	12.00 to 19.30
1926	7.50	11.00 to 12.00	14.00 to 27.00	10.00 to 20.00
1927	9.00	10.00 to 12.00	14.50 to 35.00	12.00 to 16.50
1928	7.20	11.00	14.25 to 28.00	12.00 to 17.00
1929	12.00	— —	13.00 to 29.00	9.80 to 16.00

A comparison of cost on an annual bases shows that WGT was lower in cost than CTC in each year listed in the table. The average price for refined WGT for the years 1917 to 1929 was 8.48 cents per gallon while the average price for CTC over the same period was 19.51 cents per gallon.

DISCUSSION

It is important to realize that the wood preserving industry was still in its infancy during the time periods pertinent to this research (early 1900's through the mid 1930's). In tests comparing the performance of water gas tar to coal tar creosote as a preservative, coal tar creosote performed somewhat better. However, water gas tar was less expensive, thus increasing its attractiveness from the perspective of cost-effectiveness. In addition, water gas tar was easier to transport via tank cars because it was more liquid than coal tar creosote which many times had to be heated before it could be transferred.

If a treatment facility were located close to a manufactured gas plant, one would expect the wood treatment facility to use the readily available and considerably less expensive water gas tar.

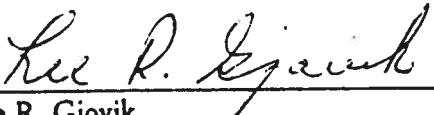
CONCLUSION

On the basis of the foregoing facts and opinions, my professional opinion is as follows:

1. A manufactured gas plant, which used a carbureted water gas process, would produce a tar characterized as "water gas tar".
2. Water gas tar could be and was used as a wood preservative during the later part of the last century, starting in 1889 and continuing through 1935.

3. It would be possible to use water gas tar as a wood preservative in the same form the water gas tar would come from the manufactured gas plant. In other words, the water gas tar would not require processing before being used in the treatment of wood.
4. The price of water gas tar was less than the price of coal tar creosote. A wood treatment facility located near a source of water gas tar would be expected to use the water gas tar, rather than incurring the additional expense of purchasing the more expensive coal tar creosote.

Sincerely,



Lee R. Gjovik

Appendix A

Curriculum Vitae

Lee R. Gjovik
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CONSULTANT

Experienced consultant providing problem solving analyses to manufacturers, builders, architects, contractors and the consuming public on wood related problems. Extensive experience working with Government regulatory agencies, State agencies that specify and use treated wood, standard writing organizations such as American Wood-Preservers' Association and American Society for Testing and Materials.

Professional Highlights

Thirty-six years experience providing information on wood deterioration/wood protection, wood treatment/wood preservation, wood preservation standards and specifications, and Government regulations concerning the use of wood preservatives. I was assigned the leadership responsibility by USDA to develop the biological and economic assessment of the three major types of wood preservatives for regulatory purposes. I have had sole responsibility for preparing and revising the Federal Specification for wood preserving practices and have published over 80 research papers on the general subject of wood preservation.

Research

Conducted research on basic problems associated with wood protection such as treating different species of wood and treating different forms of wood. I have presented my research results at National and International meetings, workshops and seminars. In addition I have organized a number of national workshops on wood preservation.

EDUCATION AND PROFESSION

Education

B.S. Wood Science and Technology University of Minnesota, 1959
M.S. Wood Science and Technology University of Minnesota, 1961

Professional Employment

1989-present	Consultant
1976-1989	Research Specialist/Wood Preservation, Forest Products Laboratory, Madison, WI.
1969-1976	Supervisory Research Forest Products Technologist, Forest Products Laboratory, Madison, WI
1961-1969	Research Forest Products Technologist, Forest Products Laboratory, Madison, WI

Professional Activities

1972-1974	Chairman of Ad Hoc Committee, American Wood-Preservers' Association
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1975-1982	Chairman of Committee on Piling, American Wood-Preservers' Association
1982-1985	Executive Committee, American Wood-Preservers' Association
1985-1986	Chairman of the Technical Program Committee, American Wood-Preservers' Association
1986-1987	Chairman of the Committee on Committees, American Wood-Preservers' Association
1987-1990	President and past president, American Wood-Preservers' Association
1975-1982	Standards Review Committee, American Wood Preservers Bureau
1974-1982	Chairman of Technical Committee on Treated Wood Products, Forest Products Research Society
1969-1981	Chairman of Subcommittee on Durability and Exposure, American Society for Testing and Materials
1986-present	Chairman of Preservative Subcommittee, American Society for Testing and Materials
1966-1980	Treatment and Coatings Standard Committee National Wood Window and Door Association
1968-present	International Research Group on Wood Preservation
1974-present	International Union of Forestry Research Organization, Division 5
1977-present	Railway Tie Association
1975-1985	Wood Preservative Advisory Task Force of FAO
1977-1984	Team Leader of the USDA Assessment Team for RPAR Review of Pentachlorophenol, Creosote, and Arsenical Preservatives

Honors and Distinctions

1972	Cash award from the U.S Government for research contributions on the modified double-diffusion system of treating wood in Alaska
1980	Cash award from the U.S. Government for leadership in preparing the USDA/States/EPA Assessment Team Report
1972-present	Guest lecturer at the University of Wisconsin.
1975-present	Guest lecturer at the University of Minnesota.

References

Will be provided upon request.

Appendix B

Gjovik's Publications

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1998 Service Life of Rocky Mountain Area Fenceposts Treated by Double-Diffusion Methods. To be published in the Rocky Mountain Research Station Paper.
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Appendix C

- 1912 Proceedings, American Wood-Preservers' Association
- 1913 Proceedings, American Wood-Preservers' Association
- 1916 Proceedings, American Wood-Preservers' Association
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- 1918 Proceedings, American Wood-Preservers' Association
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